



GOVERNMENT OF GUJARAT

Development of Government fish farms on PPP mode

Agro and Food Processing

Government of Gujarat



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The concept

The project envisages Development of Government fish farms on PPP mode based on the raw material strength of Gujarat such as marine fishing and inland freshwater shrimp farming.

What is fish farming?

- ▶ Fish farming or pisciculture involves raising fish commercially in tanks or enclosures, usually for food. It is the principal form of aquaculture.
- ▶ The most important fish species used in fish farming worldwide are carp, salmon, tilapia, trout, sturgeon and catfish.
- ▶ Fish farming is commonly described as being extensive, semi-intensive or intensive.



Extensive



- ▶ Fish farming done in the ocean, natural and man-made lakes, and rivers.
- ▶ The fish are grown without the use of fertilizer or farmer feeding.

- ▶ Fish obtain significant nutrition from the food web within their pond, but they are also given supplementary feed at least two times per week.

Semi-intensive



- ▶ Fish are raised in artificial tanks at very high densities and are subject to supplemental feeding and fertilization.

Intensive



Types of fish farms

Cage system



- ▶ Uses existing water resources but encloses the fish in a cage or basket that allows water to pass freely between the fish and the pond.

Pond system



- ▶ Basic requirement for this method is to have a ditch or a pond that holds water and the fish are artificially fed

Tank system



- ▶ Involves a series of culture tanks and filters where water is continuously recycled and monitored to keep optimal conditions

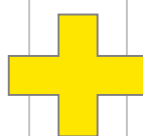
Raceways system



- ▶ An artificial channel, usually rectangular basins or canals constructed of concrete, based on the continuous water flow.

Public-Private Partnership in fisheries in India

- ▶ The public sector has been contributing to the growth in fisheries, in research, education, extension, as also in development through Fish Farmers' Development Agencies (FFDAs) and Brackishwater Development Agencies (BFDAs), fishing harbours and jettys.



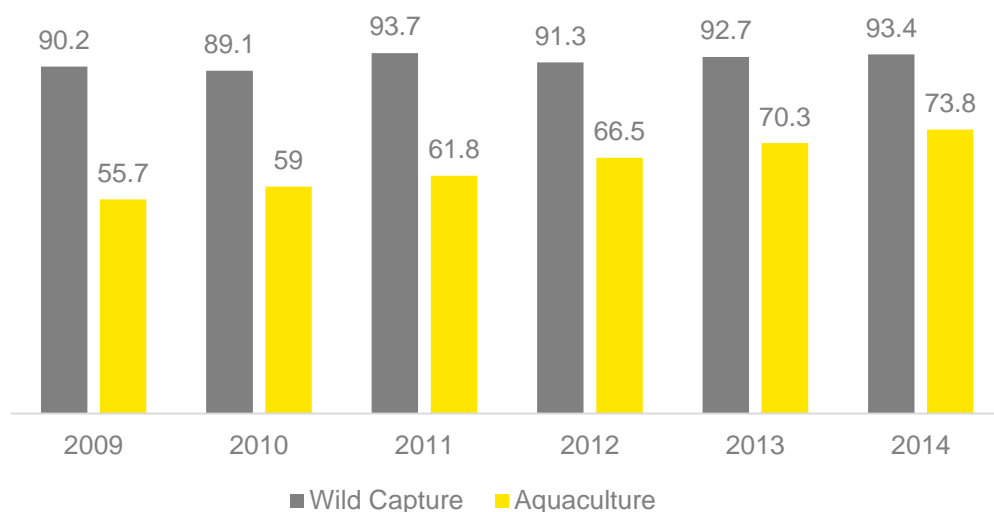
- ▶ The private sector is involved in a big way in boat building, fish-net making, fishing and fish processing. Most of the fishseed production, whether of carps or shrimp, is with the private sector and in the recent past, it has taken to fish-feed manufacture and disease diagnostics

Public-Private partnerships can address concerns in the following areas:

- ▶ Deep-sea fishing, opensea cage farming, seed certification, feeds, diagnostics and facilitation of processes of technology incubation and access to facilities by the students in the above areas.
- ▶ Issues of evaluation and introduction of exotic fish and shellfish species, particularly the ornamental fishes, reservoir fisheries management, markets and cold chains and market intelligence can also be effectively leveraged in this mode.
- ▶ Manufacture of fishing boats and nets, and establishment of aqua-shops, as a single window facility for aquaculture.

Global fisheries sector

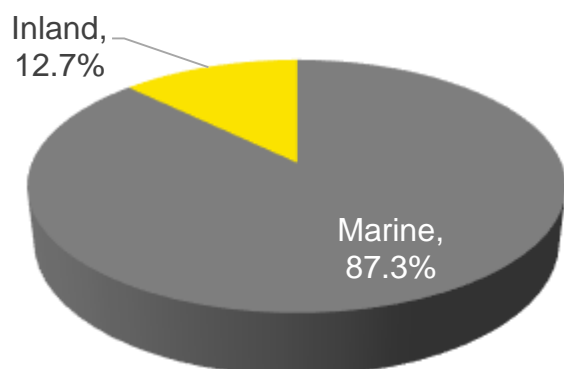
Global fisheries and aquaculture production (million tons)



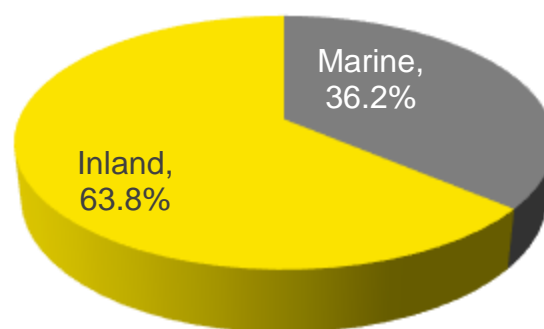
- ▶ Aquatic food production is categorized into capture of wild fish and culture of farmed species (aquaculture).
- ▶ In 2014, aquaculture sector's contribution to the supply of fish for human consumption overtook that of wild-caught fish.
- ▶ China has played a major role in this growth as it represents more than 60% of world aquaculture production.

Source: "The State of World Fisheries and Aquaculture 2016 (SOFIA)," Food and Agriculture Organization

Capture fishery production in 2014



Aquaculture fishery production in 2014



Source: "The State of World Fisheries and Aquaculture 2016 (SOFIA)," Food and Agriculture Organization

Reasons for growth of fish consumption and production

- ▶ Annual per capita consumption of fish has grown steadily in developing regions (from 5.2 kg in 1961 to 18.8 kg in 2013) and in low income food-deficit countries (LIFDCs) (from 3.5 to 7.6 kg).
- ▶ Fish consumption has risen significantly due to reductions in wastage, better utilization, improved distribution channels, and growing demand linked to population growth, rising incomes and urbanization.
- ▶ International trade plays a major role in the fisheries and aquaculture sector as an employment creator, food supplier, income generator, and contributor to economic growth and development, as well as to food and nutrition security.

Market Potential



Indian fisheries sector – 2nd largest fish producer in the world



6.3% of the global fish production



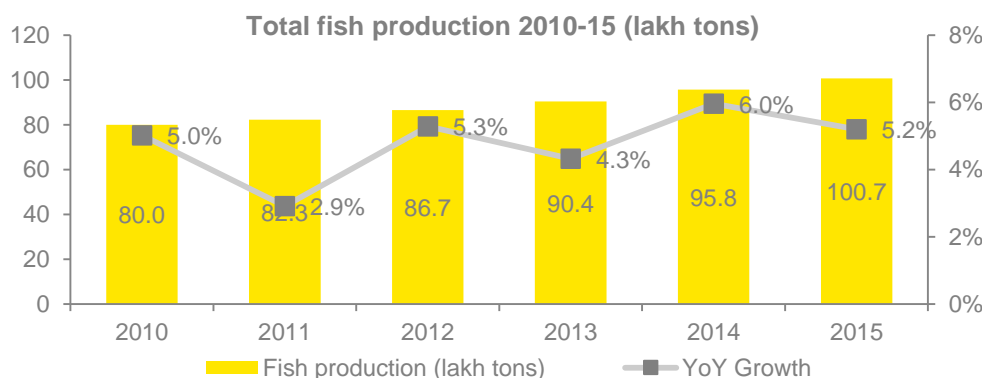
Fisheries sector contributes **1.1%** of the GDP and **5.1%** of the agricultural GDP

- ▶ Indian fisheries and aquaculture provides employment to over 14 million people.
- ▶ India has more than 10% of the global biodiversity in terms of fish and shellfish species

Inland	
Total inland water bodies (lakh Ha)	73.6
Rivers & canals (Km)	1,95,210
Reservoirs (Lakh ha)	29.1
Tanks & ponds (lakh Ha)	24.1
Flood plain lakes (lakh Ha)	7.9
Brackish water (lakh Ha)	12.4

Marine	
Length of coast line (Km)	8,118
No of Fishing villages	3,432
No of fishermen families	8,74,749
Fisher-folk population	40,56,213

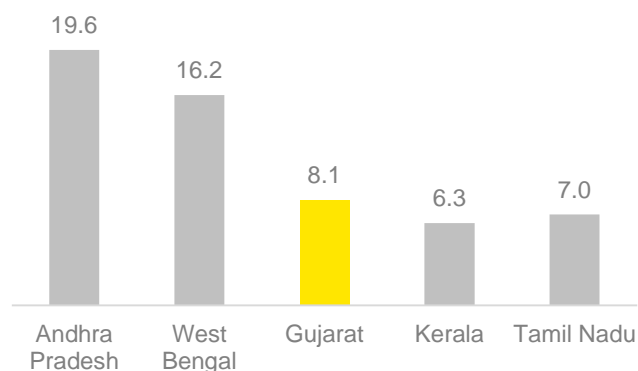
Source: State Governments, CIFRI & CMFRI



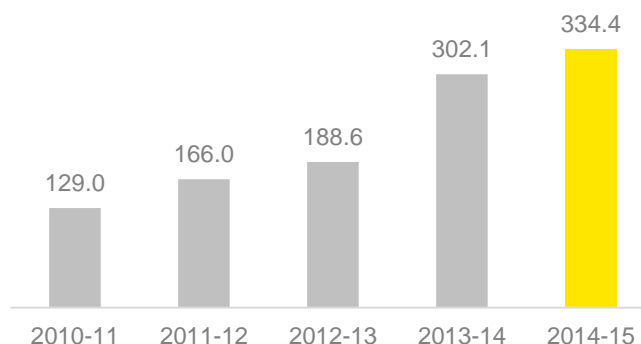
▶ The total fish production of 10.1 million metric tons in 2015 has nearly 65% contribution from the inland sector and 35% from marine fisheries.

Source: "Fisheries profile of India," Department of Animal Husbandry, Dairying and Fisheries

Top five fish producing states during 2014-15 (lakh tons)



Value of exports of fisheries products (in INR billions)



Source: "Fisheries profile of India," Department of Animal Husbandry, Dairying and Fisheries; NFDB website

1 Government support for PPP mode

- ▶ The government is favouring public-private-partnership (PPP) to promote fisheries and aquaculture.
- ▶ Although India is the world's top producer of inland aquaculture, but the country still needs to progress in the area of ornamental fishes and other varieties
- ▶ To tap the untapped potential in this sector the government is opting for the PPP mode to expand the fisheries infrastructure.

2 Blue revolution

- ▶ The government is focusing on bringing 'Blue revolution' to boost fish production so as to address the problem of hunger and malnutrition in the country.
- ▶ Government of India (GOI) is aiming to realize the full potentials of Indian fisheries through coordination of different agencies, public-private partnerships, adoption of innovative production techniques, utilization of less utilized water resources such as reservoirs and proper effective marketing.

3 Government subsidies and schemes

- ▶ GOI is formulating proposals increase subsidies for development of inland fisheries -- from the present 20-25% to 50% of the project cost.
- ▶ The GOI also developed 21 lakh hectare area for seed production and sanctioned 252 fish markets across the country in 2014.

4 Rising exports provide opportunity for further development

- ▶ Seafood exports from India grew by 11% y-o-y reaching INR334.4 billion in 2014-15. The volumes at 10,51,243 tonnes showed a growth of 7% - of which frozen fish was the second largest exported item accounting for 29% share.
- ▶ Increased production can contribute significantly to India's exports, especially since Indian fishing products are well received globally.

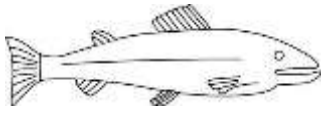
5 Huge resource base

- ▶ Huge resource base for developing fisheries:
 - ▶ Long coastline of 8118 km and large areas under estuaries, backwaters, lagoons
 - ▶ 1.96 lakh kms of rivers & canals, 29.1 lakh hectare reservoirs, 24.4 lakh hectare ponds and tanks, 7.9 lakh hectare of derelict water bodies and 12.4 lakh hectare brackish water areas

Gujarat - Competitive Advantage



Gujarat – 3rd largest fish producing state in India



8.1 lakh tons of fish production during 2014-15



Marine fish production constituted about **86.2%** of total fish production in Gujarat during 2014-15

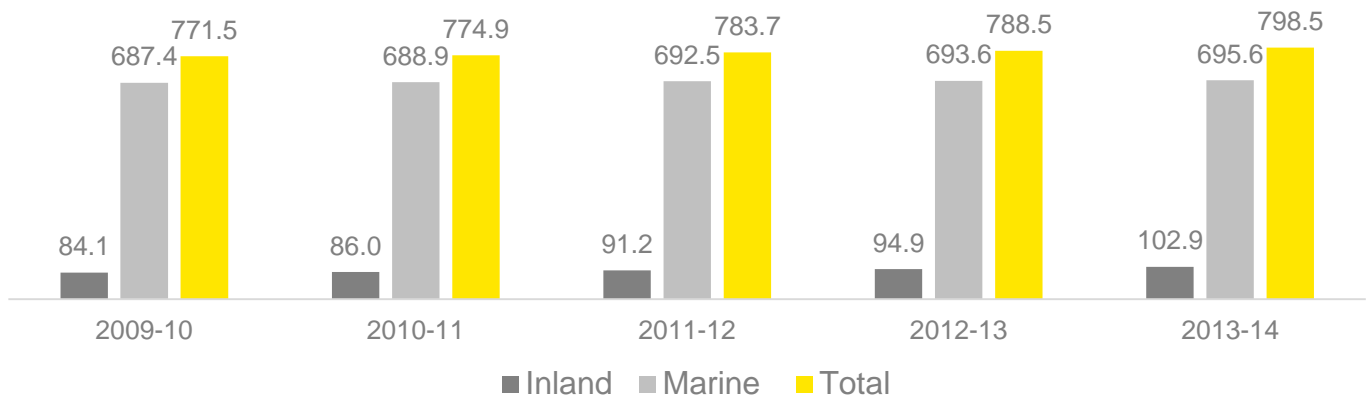
Gujarat is equipped with –

1,600 km long coast line

4.3 lakh hectare inland water bodies

716 fishing villages

Fish production in Gujarat during 2009-14 (in '000 tons)



Source: "Fisheries profile of state – Gujarat," Department of Animal Husbandry, Dairying and Fisheries

Inland resources for fisheries	
Rivers & canals (Km)	3,865
Reservoirs (Lakh ha)	2.55
Tanks & ponds (lakh Ha)	0.22
Flood plain lakes/derelict waters (lakh Ha)	0.12
Brackish water (lakh Ha)	0.89
Rivers & canals (Km)	3,865



- ▶ In 2014-15, Gujarat earned foreign exchange earnings of INR3645.23 crore through export of 245434 tonne of fish and fish products.
- ▶ Pipavav port in Gujarat contributed the largest share of seafood exports in quantity terms in 2014-15.

Source: "Fisheries profile of state – Gujarat," Department of Animal Husbandry, Dairying and Fisheries

Supply of machinery for fisheries

Motorized & Mechanized	Motorized & Non-Mechanized	Non-Mechanized	Total
16,429	11,099	76	27,604

Source: "Fisheries profile of state – Gujarat," Department of Animal Husbandry, Dairying and Fisheries

Research centres for developing fisheries in Gujarat

- ▶ The Regional Research Centre (RRC) of ICAR- Central Institute of Freshwater Aquaculture (CIFA), Anand, Gujarat is the fourth research centre of CIFA
- ▶ Veraval Research Centre of Central Marine Fisheries Research Institute

Other advantages

Ease of doing business

- ▶ Only state which comply 100% with the environmental procedures. Gujarat fares highly when it comes to setting up a business, allotment of land and obtaining a construction permit.

Gujarat leads in ease of doing business in India

Overall ranking	1
Land allotment and obtaining construction permit	2
Complying with environment procedures	1
Complying with Labour regulations	2
Obtaining infrastructure related utilities	2
Carrying out inspections	2
Enforcing contracts	3

Source: World Bank

Flourishing economy

Gujarat contributes 7.2% of the Nation's GDP and shows leadership in many areas of manufacturing and infrastructure sectors. Gujarat's SDP (State Domestic Product) at current price registered a growth of 11% during the year 2014-15.

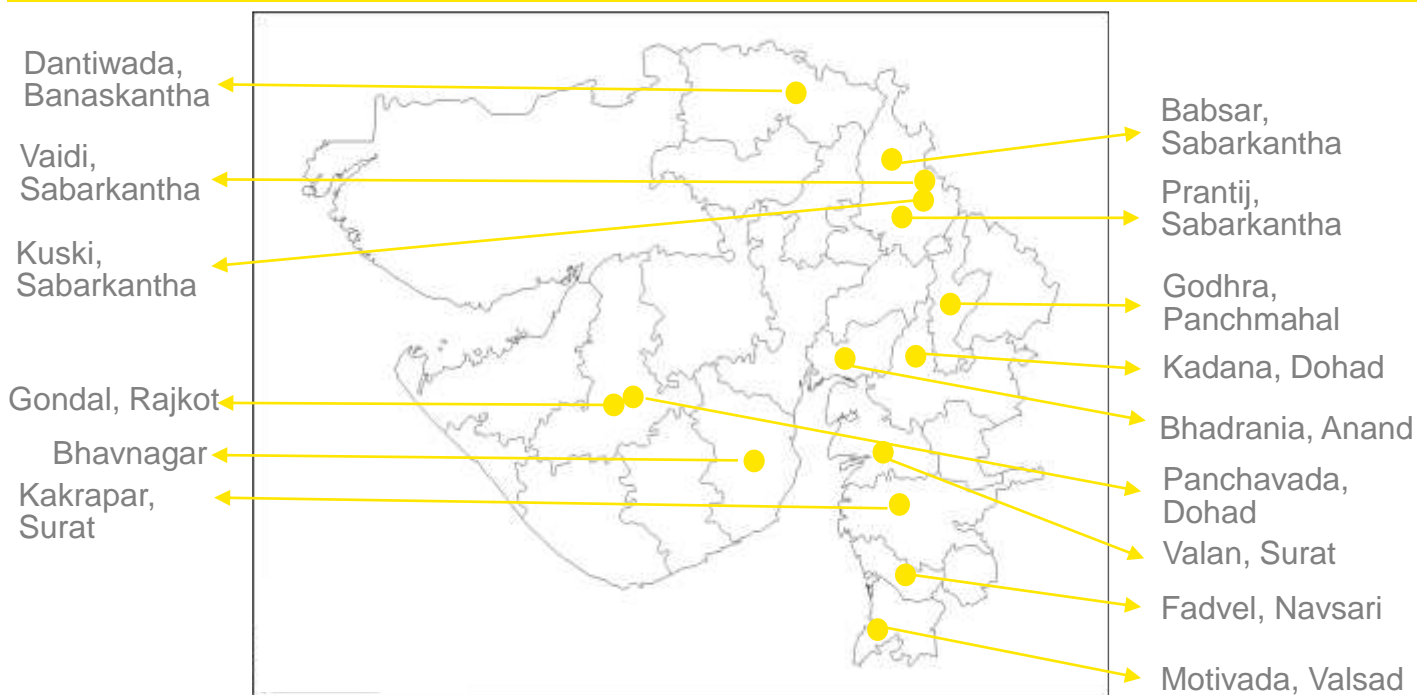
Strategic location and better infrastructure

Located on the west coast of India, Gujarat is well connected to the major cities of the world by air and sea routes. The state has 45 ports, 12 domestic airports and 1 international airport in addition to an extensive rail and road network.

Project Information



Potential Locations



Details of government fish seed farms in Gujarat

Name of the farm	Village	District	Nurser y No	Pon d area*	Rep airi ng No	Pon d Area *	Str oki ng No	Pond Area*	Hat che ry are a*	Total area on farm *	Wate r sprea d area*	Year of constru ction
Godhra	Godhra	Panchmahal	15	0.15	12	0.62	5	1.01	No	2.87	1.78	1963-65
Kadana	Kadana	Dohad	7	0.14	7	0.84	15	1.22	No	2.42	2.2	1986-87
Panchvada	Panchvada	Dohad	0	0.00	12	2.31	0	0.0	No	5.00	2.31	1988-89
Prantiz	Prantij	Sabarkantha	4	0.13	16	1.75	2	0.39	No	4.03	2.27	1964-65
Babsar	Babsar	Sabarkantha	6	0.15	12	1.5	1	0.27	No	4.00	1.92	1983-84
Fadvel	Fadvel	Navsari	8	2.00	8	2.0	4	1.53	No	10.00	5.53	1990-91
Motivada	Motivada	Valsad	14	0.63	7	0.14	5	0.27	No	6.00	1.04	1986-87
Bhadrania	Bhadrania	Anand	14	0.30	22	4.50	3	2.2	Yes	15.00	7.00	1984-89
Valan	Valan	Surat	8	0.80	8	1.68	2	0.9	No	0.00	3.38	1989-90
Kakrapur	Kakrapur	Surat	0	0.00	0	0.0	0	0.0	No	6.40	1.64	1965-66
Akavada	Akavada	Bhavnagar	4	0.20	9	0.94	0	0.0	No	5.30	1.14	1988-89
Bahdar	Bahdar	Rajkot	14	0.50	23	1.34	0	0.0	No	6.00	1.84	1983-84
Dantivada	Dantivada	Banaskantha	14	0.45	7	0.44	2	0.33	No	2.50	1.24	1966-67
Vaidi	Vaidi	Sabarkantha	12	0.42	18	2.43	2	0.49	No	7.75	3.28	1989-90
Kuski	Kuski	Sabarkantha	16	0.40	13	1.6	1	0.80	No	10.00	2.80	1989-90

*All areas in hectares

Project Information



Location: Anand

Anand profile

Agro Ecological Sub Region (ICAR)	Western plane and hill region
Agro-Climatic Region (Planning Commission)	Gujarat Plains and Hills region
Geographic coordinates of district	2203'40.53"N 72057'16.41" E

Fisheries profile in Anand (as on 30-04-2011)

Capture

i) Marine	No of fisherman	Boats		Nets		Storage facilities (ice plants etc)
		Mechanised	Non-mechanised	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
	2,434	-	168	-	5,644	-
ii) Inland	No farmer owned ponds		No of reservoirs		No. of village tanks	
	3		2		282	

Culture

	Water spread area (hectare)	Yield (ton/hectare)	Production ('000 tons)
i) Brackish water	-	-	
ii) Fresh water	-	4.0	5.2
Others marine water	51 km coastal line	-	2.4

Source: Department of Fisheries, Gandhinagar



- ▶ Regional Research Center Anand of ICAR - Central Institute of Freshwater Aquaculture has been set up with the objective of developing location specific technologies for freshwater fish farming, standardization of breeding and culture techniques of regionally important fish species, and capacity building of line department officials and imparting need based training for fish farmers.
- ▶ Anand Agricultural University introduced 'Portable FRP Carp Hatchery' - new technology of fish seed production amongst fish farmers of middle Gujarat

Infrastructure Availability

Logistics & Connectivity - Anand



Rail

- ▶ In total there are 40 railway lines in Anand.
- ▶ It is well connected with Godhra, Ahmedabad, Kheda, Khambhat, Vasad and Mumbai through a broad gauge rail line of 147 km.
- ▶ With an estimated cost of INR15 Crore (USD 3.65 million), a rail project, linking Khambhat port with Anand to Ahmedabad has been initiated.



Road

- ▶ National highway (NH) 8 passes through Anand and connects it to Vadodara (38 km) and Kheda (21 km).
- ▶ Distance with major industrial centers in Gujarat: Ahmedabad (73 km), Rajkot (255 km), Jamnagar (343 km), Ankleshwar (122 km), Bhavnagar (242 km), Mehsana (147 km), Surat (205 km)



Air

- ▶ Nearest airports are Ahmedabad and Vadodara.



Port

- ▶ Nearest ports are Dahej and Hajira ports.
- ▶ A port based project is proposed near Khambhat, which includes Ship building yards, envisaging the cargo handling capacity of 7 MMTPA.

Utility - Anand



Water

- ▶ Gujarat Industrial Development Corporation (GIDC) is responsible for ensuring consistent water supply in industrial areas.
- ▶ For the improvement of water supply and sewerage system in Anand, Urban Development has commissioned a project along with Urban Housing Department



Power

- ▶ Anand has two power stations, connected to Ahmedabad and Vadodara
- ▶ Gujarat State Electricity Corporation Limited (GSECL) has signed an MoU for 360 MW power plant project in Anand.



Gas

- ▶ There are four pipeline sections in the district of which the Anand-Rajkot section is the longest segment with 53.32 km.
- ▶ The existing gas grid in the district is 151.68 km long and the proposed length of the gas grid is 66.709 km.

Key players in the fisheries sector in India

Company	Presence in Gujarat	Headquarter Location
Sultan Fish Seed Farm	No	Haryana
Kanamia Aqua Private Limited	Yes	Navsari

Key fisheries equipment/feed suppliers in India

Company	Presence in Gujarat	Headquarter Location
Pioneer Aquaculture Consultants	No	Tamil Nadu
Abis Floating Fish Feeds	No	Rajnandgaon
Jay Khodiyar Machine Tools	Yes	Rajkot
Aquafauna Fisheries	Yes	Vadodara

Key collaboration opportunities

- ▶ The fish farms can seek to collaborate with the following government bodies to avail financial/technical assistance in setting up fish farms in Gujarat:

Gujarat Fisheries Central Co-operative Association Limited (GFCCA)

Anand Agricultural University

Regional Research Center of ICAR - Central Institute of Freshwater Aquaculture (CIFA), Anand

Key consideration

Degradation of shorelines and loss of coral reefs

- ▶ Consistent degradation of shorelines and loss of coral reefs have been major problems faced by India.
- ▶ While, inland fish production has declined due to proliferation of water control structure, loss of habitat and indiscriminate fishing, marine fishing has declined due to depleting resources, energy crisis and resultant high cost of fishing

Prevalence of antibiotic residues in Indian fisheries stocks

- ▶ The prevalence of antibiotic residues in Indian fisheries stocks is a cause of worry for people looking at creating infrastructure to keep fishing sustainable, safe and healthy.
- ▶ Antibiotic residues in farmed shrimps is a major concern which has hindered the growth of exports.

Subsidies given to the fisheries sector under threat from WTO

- ▶ Many member countries of the WTO have reiterated their reliance on Target 14.6 of the United Nations' new Sustainable Development Goals (SDG), which commits governments, by 2020, to prohibiting certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing, and refrain from introducing new such subsidies.
- ▶ This is a cause of concern for the Indian fishermen who are dependent on these subsidies.
- ▶ The WTO members have expressed interest' in getting results on fisheries subsidies at the organisation's 11th ministerial conference in 2017

Assumptions

- ▶ The site costs and other estimates are based on Kanamia Aqua Farm in Navasari, Gujarat. There are two types of fish farming processes used by Kanamia Aqua farm, fish spawning and yearling.
- ▶ **Land Requirement:** 15 hectares for setting up a fish seed farm, as per the largest government fish seed farm in Anand amongst the potential locations. Land rate has been calculated as per Gujarat Industrial Development Corporation (GIDC) rates
- ▶ Production achieved from spawning is 700 lakhs per year of which it is assumed 15% is recovered for Yearling. Thus this method would produce 105 lakhs.
- ▶ Production achieved from yearling is estimated to be 50,000 pieces. If it is assumed that the recovery rate is 80%, this will make a total of 40,000 pieces which will be available for sale each year at an average weight of 1.5kg.

Project cost components	Cost (INR Millions)
Land cost (Area: 15 hectares= 150000 sq. mt.) Land rate: (INR692 per sq. mt. in Anand, w.e.f. April 2016)	103.8
Cost of building the ponds, hatcheries, supply and fitting of machinery and commercial vehicles	30.0
Maintenance cost per year (includes fish food and production equipment, staff costs, marketing, freight, insurance and other incidental costs)	14.0
Total cost of spawning	147.8
Cost of operating yearling method (includes the cost of fish, fish food, staff costs, marketing, freight, insurance and other incidental costs)	2.00
Total project cost	149.8

Profit/ revenues generated	Cost (INR Millions)
Income from spawning @INR8/piece (105 lakhs*INR8)	84
Income from yearling @INR120/piece (40,000*INR120)	4.8
Total income from farm	88.8

- ▶ Manpower requirement at the site – 70 employees (approximately)

Approvals

- ▶ At the central level, several key laws and regulations may be relevant to aquaculture. They include the century-old Indian Fisheries Act (1897), which penalizes the killing of fish by poisoning water and by using explosives, and the Environment (Protection) Act (1986), being an umbrella act containing provisions for all environment related issues. They also include the Water (Prevention and Control of Pollution) Act (1974) and the Wild Life Protection Act (1972).
- ▶ In 1996, the Indian Supreme Court ruled that an authority should be constituted to protect the ecologically fragile coastal areas, sea shore, water front and other coastal areas and specially to deal with the situation created by the shrimp culture industry in the coastal states/union territories. To perform the functions indicated by the Supreme Court, the Aquaculture Authority unit was established.
- ▶ The Aquaculture Authority has constituted State Level Committees (SLCs) and District Level Committees (DLCs).
 - ▶ Applications submitted by farmers are received by the DLCs.
 - ▶ After verification of the information and field level inspections, wherever necessary, the applications are forwarded to the SLCs for consideration.
 - ▶ After recommendation of the SLC, the applications are forwarded to the Aquaculture Authority for approval.
- ▶ Gujarat Fisheries Central Co-operative Association Limited (GFCCA) is an apex cooperative body of the fishermen cooperatives in the State of Gujarat. It was established in the year 1956 to improve the socio-economic condition of the fishermen community in Gujarat by carrying out all governmental and institutional assistance to the fishermen.

Incentives from Government of Gujarat (GoG)

- ▶ Fisheries Beneficiary Schemes:
 - ▶ Fish Seed / Shrimp seed storage
 - ▶ Boat-Nets
 - ▶ Accommodation for Fishermen
 - ▶ Resources to selling Fishes by Women
 - ▶ Patrolling Boats
 - ▶ Housing Hatchery for Coloring Fish
 - ▶ Wet Relief on the Purchase of Diesel
 - ▶ Electric Tools
 - ▶ Life Saving Equipments
- ▶ GoG has provided an outlay of INR357.5 crores for various schemes under Fisheries sector for the year 2016-17.

Approvals & Incentives



Funds released in Gujarat during the 12th five year plan

Name of Schemes	12th Plan (INR in lakhs)	
	2013-14	2014-15
Development of Inland fisheries & Aquaculture	0.00	30.00
Development of Marine Fisheries, Infrastructure & Post Harvest Operations	257.37	193.33
National Scheme of Welfare of Fishermen.	0.00	1.125
Strengthening of Database & GIS of Fisheries Sector.	19.86	23.20
National Fisheries Development Board (NFDB)	0.00	1.00

Source: "Fisheries profile of state- Gujarat," Department of Animal Husbandry, Dairying and Fisheries

Incentives from Government of India

Funds released/allocated for the fisheries sector during the 12th five year plan

- ▶ The GoI launched the "**Blue Revolution – Inland Fisheries**" in 2014 to utilize the selected potential area for fisheries development. It had provision of INR50 crore during 2014-15.
- ▶ During the 12th plan a sum of INR2483 crore has been earmarked for the development of Fisheries Sector. The funds allocated under the various fisheries development schemes are as follows:

Name of Schemes	12th Plan (INR in lakhs)	
	2014-15	2015-16
Development of Inland fisheries & Aquaculture	2632.2	3665.0
Development of Marine Fisheries, Infrastructure & Post Harvest Operations.	9285.1	7000.0
National Scheme of Welfare of Fishermen.	5204.3	4349.0
Strengthening of Database & Geographic Information System for Fisheries Sector.	750.0	495.0
National Fisheries Development Board (NFDB)	13750.0	15786.0

Source: "Fisheries profile of India," Department of Animal Husbandry, Dairying and Fisheries

Department of Animal Husbandry Dairying & Fisheries (DADF)

<http://dahd.nic.in/>

Department of Agriculture & Co-operation Department

<https://agri.gujarat.gov.in/index.htm>

Industrial Extension Bureau

www.indextb.com

Gujarat Agro Industries Corporation

<https://gaic.gujarat.gov.in/index.htm>

This project profile is based on preliminary study to facilitate prospective entrepreneurs to assess a prima facie scope. It is, however, advisable to get a detailed feasibility study prepared before taking a final investment decision.

For further details:

iNDEXTb
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